



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/685,306	10/10/2000	Marc Cartier	TER00-03	4347

7590 03/13/2002

David E Huang Esq
Chapin & Huang LLC
Westborough Office Park
1700 West Park Drive
Westborough, MA 01581

EXAMINER

ALCALA, JOSE H

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 03/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/685,306	CARTIER ET AL.
Examiner	Art Unit	
Jose H Alcala	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 24 January 2002.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-21 is/are pending in the application.
 - 4a) Of the above claim(s) 19-21 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-18 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 10 October 2000 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group 1, claims 1-18 in Paper No. 4 is acknowledged.
2. Claims 19-21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 4.

Drawings

3. The drawings are objected to because in Figure 3, Reference numbers 54 and 56 are not pointing to the diameter of the ground vias as defined by the Specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
4. Figures are improperly crosshatched. All of the parts shown in the section, and only those parts, must be crosshatched. The crosshatching patterns should be selected from those shown on page 600-81 of the MPEP based on the material of the part. See also 37 CFR 1.84(h)(3) and MPEP 608.02.

Specification

5. The abstract of the disclosure is objected to because it is too extensive, and it is more oriented to the method of making the printed circuit board, than to the actual invention. Correction is required. See MPEP § 608.01(b).

6. The disclosure is objected to because of the following informalities: In page 9, line 6, it is not clear what is meant by "a section of circuit board material", a circuit board is composed of several different elements made of different materials such as ceramic, silicone, polymers and metals, but there is not one specific thing called a "circuit board material". It is suggested to change it to: "a section of the circuit board". In addition, reference character "52" has been used to designate both "inner diameter of signal via" and "outer diameter of anti pad", when referring to Figure 2 of the drawings. In addition, reference number 24 is called the "circuit board material" in page 9, line 6, and is called "circuit board section" in page 10, line 12.

Appropriate correction is required.

Claim Objections

7. Claims 1-3, 7, 13, and 14 are objected to because of the following informalities: It is not clear what is meant by "a section of circuit board material", a circuit board is composed of several elements made of different materials such as ceramic, silicon, polymers and metals, but there is not one specific material that is called a "circuit board material". It is suggested to change it to: "a section of the circuit board". Appropriate correction is required.

8. Claims 1, 7, 12, 13 and 18 are objected to because of the following informalities: the use of the word "conductor" as in "signal conductor" and "ground conductor" is not clear enough to disclose the particulars of the invention, it is suggested to change it to "signal layer" or "ground layer". Appropriate correction is required.

9. Claim 12 is objected to because of the following informalities: in line 3, there should be a comma between the words "launch" and "and", to avoid confusions in the language and in how the elements are located one in relation with the other. Appropriate correction is required.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claims 1 and 13, it is not clear how the signal launch can include the signal and ground vias, and not include the signal and ground conductors. Is it just a name or label for the section of the circuit board, or for the vias, or is it an altogether separate element.

Claims 2 and 14, are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: How is the surface of the section of circuit board located with relation to the signal and ground conductors and the dielectric material.

Claim 3 is not clear regarding, how can the first and second surfaces be coplanar, and physically contact each of the first and second set of ground vias. It is not

clear, because the first and second set of ground vias are both located a radial distance how this can be done, because the first e

Claims 7 and 18, are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: Where does the signal pin begin, is it completely inside of the section of the printed circuit board, or does it extend to the outside of the section? In addition, it is not clear what it means to "extending perpendicularly from a plane", is it that it starts on the plane on the section of circuit board material, or if it starts in the outside of the board.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: if the connector is located on top of the signal launch, or on top of the locates Where does the signal pin begin, is it completely inside of the section of the printed circuit board, or does it extend to the outside of the section? In addition, it is not clear what is meant by: "extending perpendicularly from a plane", is it that it starts on the plane on the inside section of circuit board material, or if it starts in the outside of the board. In addition it is not clear how a surface can be part of the section of circuit board, but be distal to a surface on the same section of circuit board. Additionally, it is further unclear how are the connecting surface and the distal surface located, with regards to the other elements of

the section of circuit board such as the signal and ground conductors, and the dielectric layer.

Claim 13 is further unclear in how the coaxial connector is mounted to the signal launch. In addition it is not clear how the coaxial connector is the one that "provide(s) electrical access to the signal and ground conductors", if that is the purpose of the signal and ground vias. If what is meant is that the coaxial connector is electrically connecting the signal conductor **to** the ground conductor, it is suggested in line 18 to change from: "provide electrical access to", to: "electrically connect".

Claim 18 is unclear regarding how is the signal pin located with relation to the coaxial connector.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh (US Patent No. 5,828,555) in view of Bjorndahl et al. (US Patent No. 6,194,669). As best understood by the examiner:

Regarding claim 1, Itoh teaches a circuit board (Reference number 30), comprising: a section of circuit board material having a signal conductor (Reference number 33), a ground conductor (Reference number 34), and dielectric material (Reference number 35) that physically separates the signal conductor and the ground

conductor; and a signal launch having: a signal via (Reference number 44) that physically contacts the signal conductor and the dielectric material of the section of circuit board material, and a first set of ground vias (Reference number 46) and a second set of ground vias (Reference number 42) that physically contact the ground conductor and the dielectric material of the section of circuit board material, wherein each of the first set of ground vias is disposed a first radial distance from the signal via (See figure 3, where it is clear that each one of the first set of ground vias is disposed a first radial distance from the signal via), but fails to teach that each of the second set of ground vias is disposed a second radial distance from the signal via, and wherein the first and second radial distances are different.

Bjorndahl teaches an array (Reference number 10) for use in a circuit board, consisting of a layer having a first set of vias (Reference number 20) disposed a first radial distance from a center via used to transmit a signal (Reference number 16), and a second set of vias (Reference number 20) disposed a second radial distance from the signal via, and wherein the first and second radial distances are different.

It would have been obvious to combine the teachings of Ito and Bjorndahl, in order to incorporate the array to the printed circuit board in such way that each of the second set of ground vias is disposed a second radial distance from the signal via, and the first and second radial distances are different. Thus by arranging more of the ground vias in a circular way around the signal via, the connection between the coaxial conductor and the printed circuit board is more stable and strongly attached.

Regarding Claim 13, the combination of Itoh and Bjorndahl discloses all of the elements of the instant claimed invention as stated supra for claim 1, and further discloses a coaxial connector (Reference number 108 of the Itoh reference) that mounts to the signal launch of the circuit board in order to provide electrical access to the signal and ground conductors of the circuit board.

Regarding Claims 2 and 14, Itoh discloses a ground pad (Reference number 31), disposed on a surface of the section of circuit board material, the ground pad physically contacting each of the first and second sets of ground vias of the signal launch and the dielectric material of the section of circuit board material.

Regarding Claim 3, Itoh discloses a first ground pad (Reference number 31), disposed on a first surface of the section of circuit board material, the first ground pad physically contacting each of the first and second sets of ground vias of the signal launch and the dielectric material of the section of circuit board material and a second ground pad (Reference number 34), disposed on a second surface of the section of circuit board material, the second ground pad physically contacting each of the first and second sets of ground vias of the signal launch and the dielectric material of the section of circuit board material, but fails to teach that the second surface is coplanar with the first surface of the section of circuit board material. It would have been obvious to divide the first ground pad in two pads into two smaller ground pads, creating a first ground pad and a second ground pad both in the same surface, in order to reduce the use of material thus reducing the costs of manufacturing the circuit board.

Regarding Claims 4 and 15, the combination of Itoh and Bjorndahl further discloses that the first radial distance is smaller than the second radial distance such that the first set of ground vias is disposed closer to the signal via than the second set of ground vias (as shown in Figure 1 of Bjorndahl), and that the signal via (Reference number 44 of Itoh) has an inner diameter that is smaller than an inner diameter of each of the first set of ground vias.

Regarding Claims 5 and 16, the combination of Itoh and Bjorndahl further discloses that the first radial distance is smaller than the second radial distance such that the first set of ground vias is disposed closer to the signal via than the second set of ground vias (As seen in Figure 1 of the Bjorndahl), but fails to explicitly teach that the signal via has an inner diameter that is smaller than an inner diameter of each of the second set of ground vias. It would be suggested by the combination of the two references to make the second ground vias having the same inner diameter as the first ground vias, eliminating the extra step, reducing the production time and the extra cost of having to drill two sets of vias of different inner diameters.

Regarding Claims 6 and 17, the combination of Itoh and Bjorndahl further discloses that the first radial distance is smaller than the second radial distance such that the first set of ground vias is disposed closer to the signal via than the second set of ground vias (As seen in Figure 1 of the Bjorndahl), but fails to explicitly teach that each of the first set of ground vias has an inner diameter that is smaller than an inner diameter of each of the second set of ground vias. The Itoh reference teaches that one of the sets of ground vias is smaller than the other. It would have been obvious to one of

ordinary skill in the art at the time the invention was made to modify the combination so that the first set of ground vias has an inner diameter that is smaller than an inner diameter of each of the second set of ground vias. Thus reducing the amount of time that it takes to make the first set of ground vias, by having to remove less material from the printed circuit board. In addition, that would be a mere change in shape, component that would be generally recognized as being within the level of ordinary skill in the art.

See *In re Dailey*, 149 USPQ 402 (CCPA 1976).

Regarding Claims 7 and 18, the Itoh reference further teaches a signal pin (Reference number 108a) that electrically connects with the signal conductor of the section of circuit board material through the signal via, the signal pin extending perpendicularly from a plane of the section of circuit board material.

Regarding Claim 8, the Itoh reference further inherently teaches that the signal pin has a diameter that is less than an inner diameter of the signal via (It is the only way to fit inside of it), and wherein the signal pin connects to the signal via through a solder joint (As shown in Figure 13).

Regarding Claim 10, the combination of Itoh and Bjorndahl discloses all of the elements of the instant claimed invention as stated supra for claim 1, but fail to explicitly teach that the dielectric material of the section of circuit board material separates the first set of ground vias from the signal via by less than 0.082 of an inch. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to decrease the space between the first set of ground vias and the signal via in order to reduce the amount of material used and to achieve integration. In addition it

has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding Claim 11, the combination of Itoh and Bjorndahl discloses all of the elements of the instant claimed invention as stated supra for claim 1, but fails to explicitly teach that each of the first set of ground vias is disposed between the signal via and a respective one of the second set of ground vias. It would have involved a mere change in the shape of the component, which would be generally recognized as being within the level of ordinary skill in the art. See *In re Dailey*, 149 USPQ 402 (CCPA 1976).

Regarding Claim 12, the combination of Itoh and Bjorndahl discloses all of the elements of the instant claimed invention as stated supra for claim 1, and further discloses a connecting surface (the surface where the coaxial cable is in contact with the circuit board in the Itoh reference) that faces a connector when the connector connects to the signal launch and a distal surface (the surface opposed to the surface where the coaxial cable is in contact with the circuit board in the Itoh reference) that faces away from the connector when the connector connects to the signal launch, and wherein the signal conductor of the section of circuit board material connects with the signal via of the signal launch at a point along the signal via that is closer to the distal surface than the connecting surface. See Figure 9 of the Itoh reference.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh (US Patent No. 5,828,555) in view of Bjorndahl et al. (US Patent No. 6,194,669) as applied to claim 1 above, and further in view of Jones II et al. (US Patent No. 4,861,944).

Regarding Claim 9, the combination of Itoh and Bjorndahl discloses all of the elements of the instant claimed invention as stated supra for claim 1, but fails to explicitly teach that at least a portion of the signal pin has a diameter that is greater than an inner diameter of the signal via, and wherein the signal pin connects to the signal via in a press-fit manner. Jones II, discloses a pin (Reference Number 30) that has a portion (Reference number 32) of the signal pin has a diameter that is greater than an inner diameter of the signal via, and wherein the signal pin connects to the via in a press-fit manner (See figure 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Itoh and Bjorndahl, in order to have a pin with at least a portion having a diameter that is greater than an inner diameter of the signal via and that is connecting to the signal via in a press-fit manner, in order to eliminate the use of solder and eliminating a step in the assembly of the circuit board, thus reducing costs of manufacturing and assembly.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references have some teachings similar to aspects of the instant claimed invention: Sullivan et al. (US Patent No 5,050,295), Hewison et al. (US Patent No 5,174,768), Chobot et al. (US Patent No 5,363,280), Watanabe (US Patent No 5,326,937), Giri et al. (US Patent No 6,037,044), Burkhart (US Patent No 6,255,601) and lawane (US Patent No 5,719,750).

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose H Alcala whose telephone number is (703) 305-9844. The examiner can normally be reached on Monday to Friday.
16. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.
17. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JHA
March 9, 2002

*Joseph H. Alcala
Jose H. Alcala
Primary Examiner*